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Writing Open Science Syntax

Some thoughts and examples

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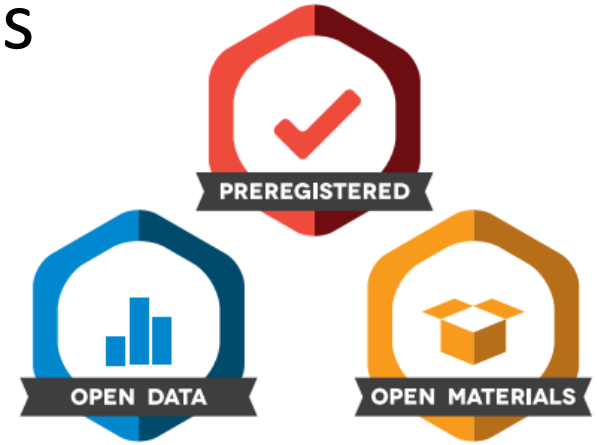
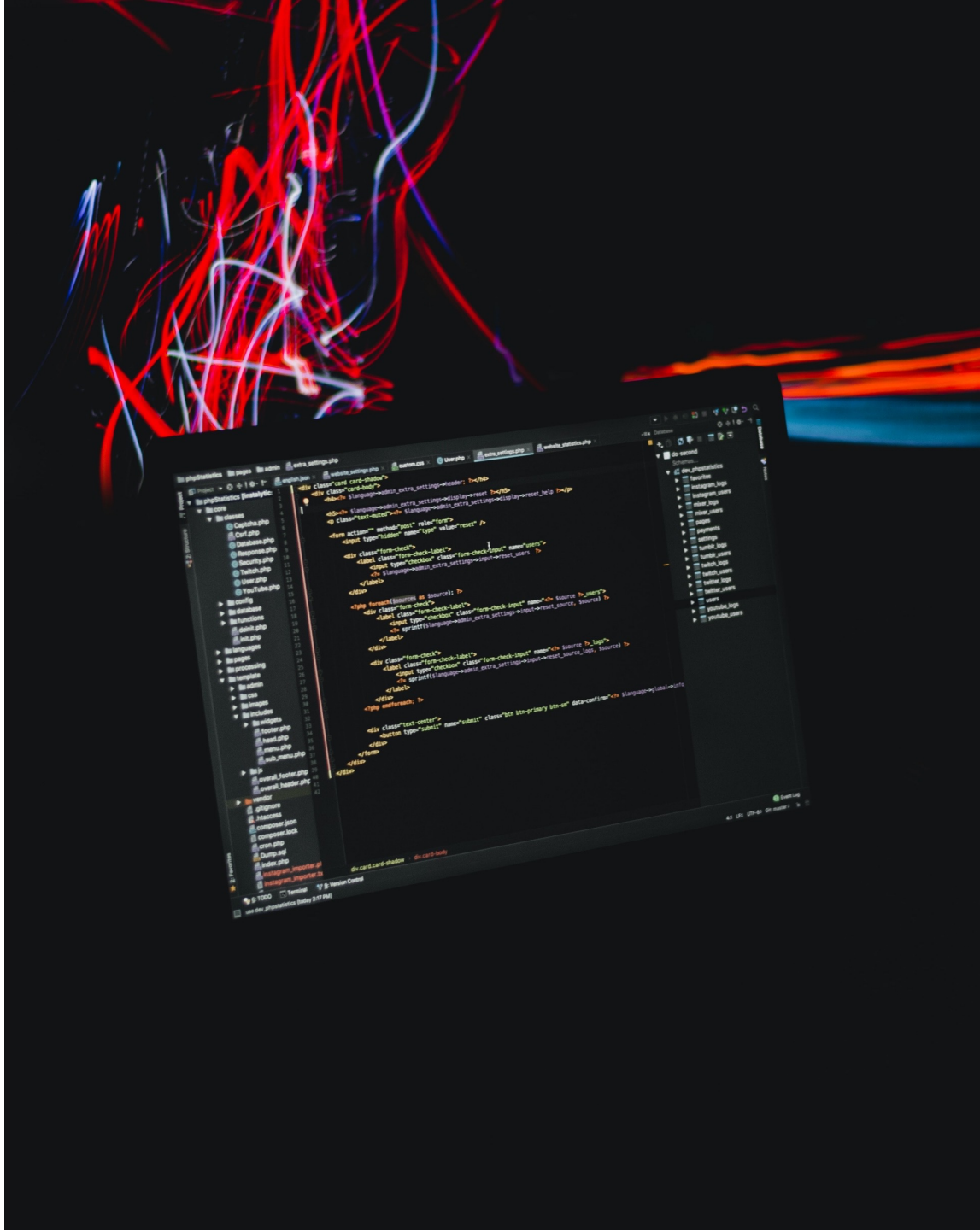
Get to terms

Open science syntax

Analytic code underlying the data generation, preparation, manipulation, analysis, visualization, and/or the reporting of results





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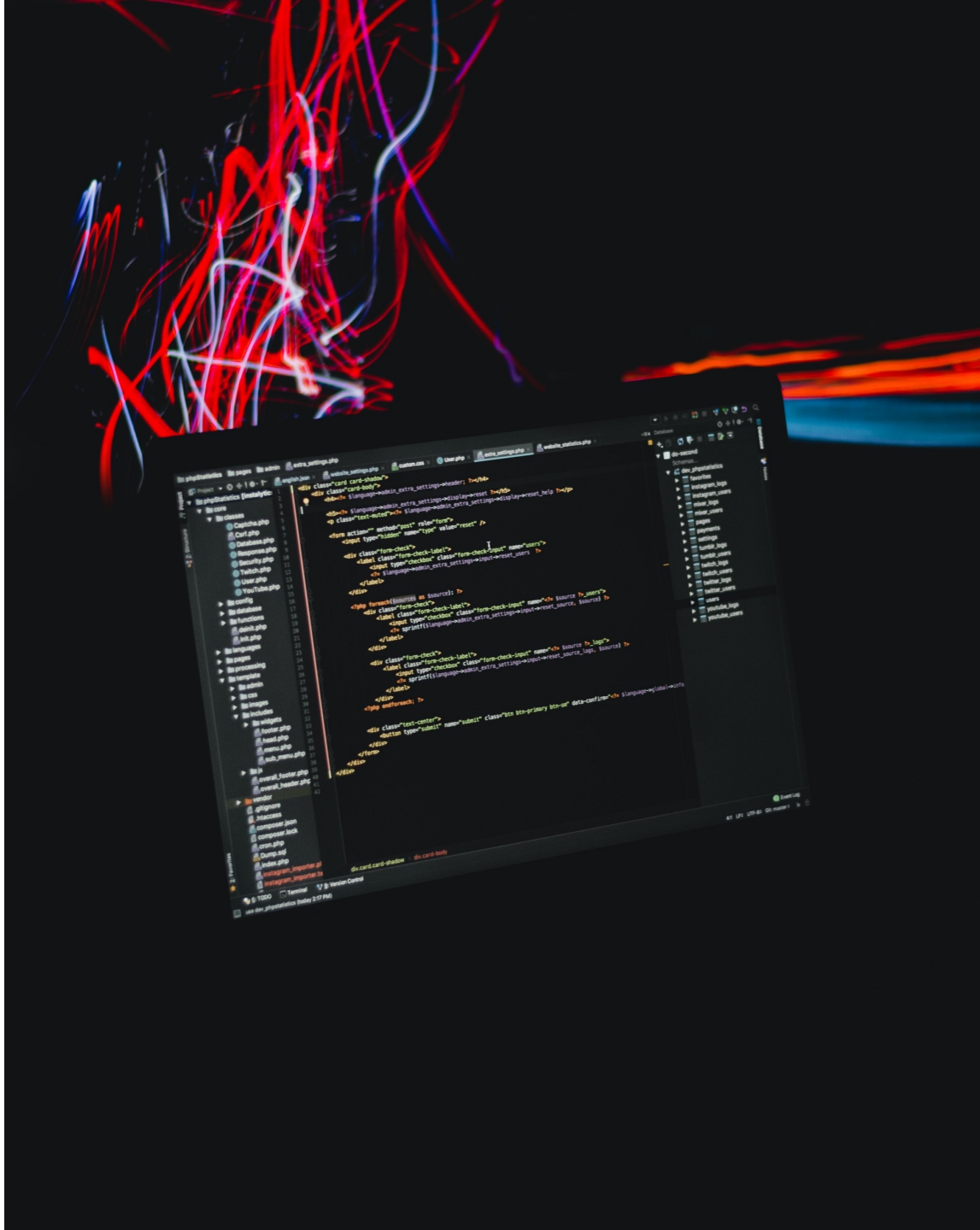
Why?

- Openness, transparency, & responsibility
- Reproducibility & replication
- Inclusion in research syntheses
- Transferability of your analytic approaches and/or code
- Publication of code
- Mandatory for paper submission

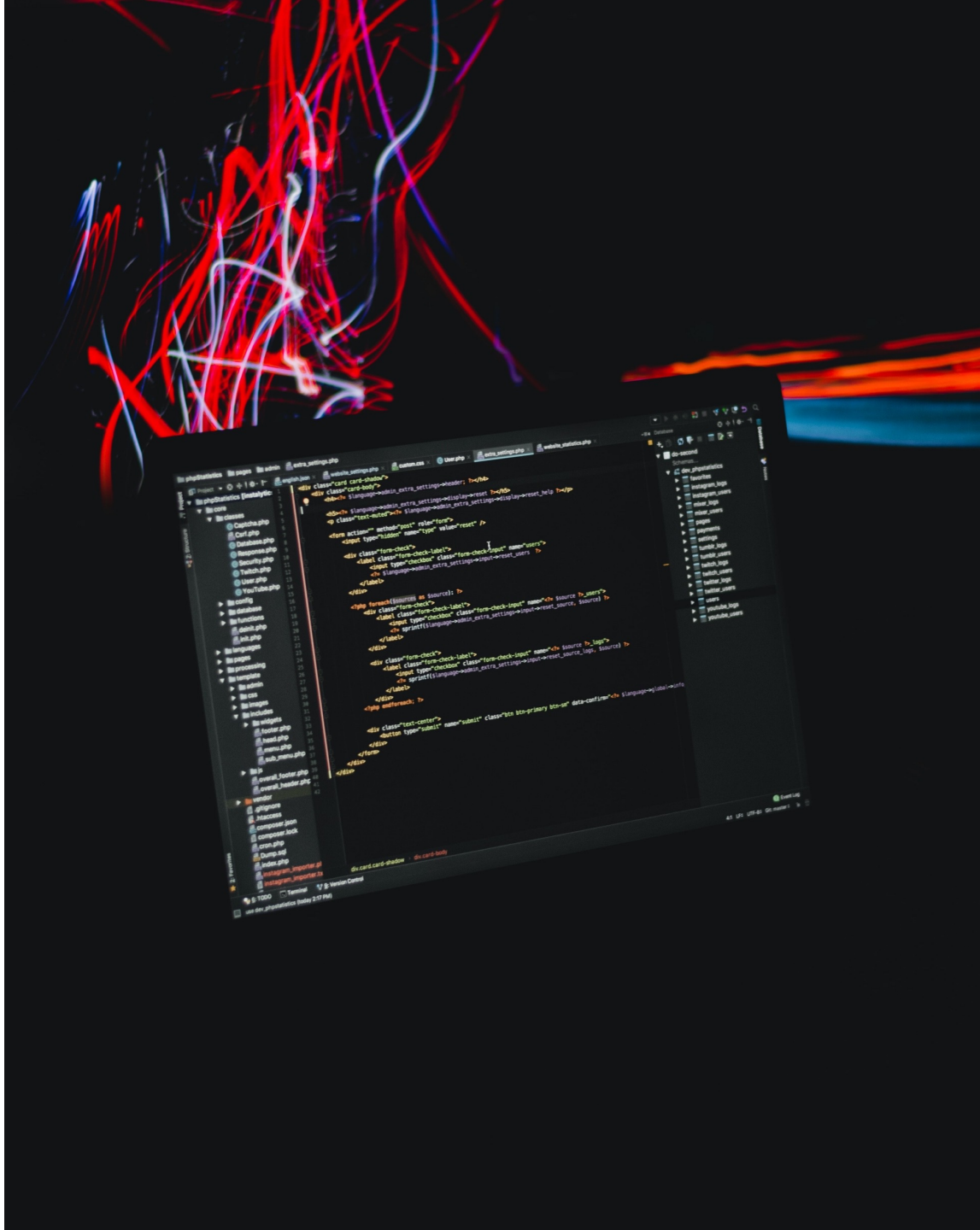


See also: Goldacre et al. (2019), https://doi.org/10.1136/bmj.l6365

How?

- Supplementary material or appendices as part of a scientific publication
- Code-publishing journals
- Open repositories for data and code (citable with DOI)

OSF GitHub zenodo



Some Principles

Comment and describe.

```
## Model estimation
cfamdm.mimic1.dif.tpk1.fit <- sem(cfamdm.mimic1.dif.tpk1,
                                  data = covid19otl,
                                  missing = "FIML",
                                  estimator = "MLR",
                                  se = "robust.mlr")

## Summary
summary(cfamdm.mimic1.dif.tpk1.fit,
        rsquare = TRUE,
        fit.measures = TRUE,
        standardized = TRUE)
```

```
OUTPUT:
          STDYX;       ! Fully standardized parameters requested
          STDY;        ! Standardized parameter estimates requested
          SAMPSTAT;    ! Sample statistics
          CINTERVAL;   ! Confidence intervals
```

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Some Principles

Make available the input and output.

But: Think about data sharing options/restrictions.

```
# Pedagogical support (PISCO2)
summary(covid19otl$PISCO2)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   0.000   2.000   3.000   2.765   4.000   5.000       4
```

Easy way: rmarkdown RStudio®

Some Principles

Make available the input and output.

````
Using these two variables, we created a new binary variable that we define
a-priori as the variable representing study quality. The resultant binary
variable (`binary.quality`) is coded as 1 if the primary study followed a
pretest-posttest control-experimental group design with randomization and 0
else.

```{r study quality score, include = TRUE, message=FALSE, cache = TRUE}
## Create a new binary quality variable
transferct$binary.quality <- 0
transferct$binary.quality[transferct$Random==1 &
                          transferct$PPCDesign==1] <- 1

## Description of the study quality indicator
table(transferct$binary.quality)

```
````

Some Principles

Make available the input and output.

Supplementary Material

Illustrative Example: Transfer Effects of Learning Computer Programming

09 January 2023

A-Priori Selection of a Single Binary Quality Variable

In this example, we show how researchers can explore the influence a single, binary quality variable may have on the effect sizes and their heterogeneity.

Data preparation

Install and load relevant `R` packages | Read in and prepare the data | Describe the data

```
# Install relevant packages
# install.packages("pacman")

# Load packages after every reboot of computer
library(pacman)
pacman::p_load(psych,
               metafor,
               clubSandwich,
               robumeta)
```

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Some Principles

Test and evaluate your code.

Make it work and provide information about the software versions.

```
sessionInfo()
```

Easy way:

Some Principles

Cite sources of adopted and adapted code.

More suggestions: Trisovic et al. (2022), https://doi.org/10.1038/s41597-022-01143-6